

the penultimate joints scarcely transverse. Head coarsely and closely punctate, with only a small space on the disk glabrous. Thorax long and narrow, punctured like the head, with a broad, definite, longitudinal space smooth. Elytra elongate and narrow, rather closely and coarsely punctate, black, only the hind margin indefinitely fusco-testaceous.

A single example was found at Yokohama, 7th April, 1880.

Cafius rufescens, n. sp.

Rufo-brunneus; capite thoraceque nigricantibus; antennis rufis, pedibus fusco-testaceis, cinereo-pubescens, opacus; capite thoraceque dense, fortiter profundeque punctatis, linea longitudinali lata, arguta, glabra.

Long. 5 millim.

This species is allied to the European *Philonthus sericeus*, auct., but is distinguished by the colour and other characters apparently subject to but little variation. The head and thorax are much more deeply and coarsely punctate, and the glabrous line on these parts is broader, definite, and more shining, the antennæ are shorter, and the punctuation of the elytra and hind body is not quite so dense and fine. From *P. algarum* it is distinguished by the colour, the much less slender form, and much shorter and thicker antennæ. The male is distinguished by the possession of a setigerous pore on each of the second and third ventral plates and by a large excision of the terminal plate. The setigerous pores do not exist in the corresponding sex of the allied species.

Yokohama, Niigata, Hakodate, under seaweed, probably generally distributed in suitable localities on the coast. I have a specimen from Hong Kong in my collection.

[To be continued.]

V.—*Ophiopteron elegans*, a new, probably Natatory, Form of *Ophiurid*. By Dr. HUBERT LUDWIG*.

AMONG the Holothuriæ which Dr. J. Brock collected during his travels in the Indian Archipelago and entrusted to me to be worked up there was a single example of an Ophiuran

* Translated from the 'Zeitschrift für wissenschaftliche Zoologie,' Bd. xlvii. pp. 459-464 (with a plate).

collected near Amboyna which, on close examination, appeared to be a very remarkable new form. The most striking thing about it is the circumstance that each joint of the arms bears a pair of large fins, which could hardly have any other purpose than to confer upon the animal the power of natatory locomotion.

Description of the specimen.—The disk has a diameter of 6 millim. Each of the five arms measures about 30 millim. from the margin of the disk to its apex. The colour is a uniform light greyish yellow or yellowish white; only on the ventral surface of the disk the coloration in the interradii is darker, from brownish yellowish to greyish violet.

The arms at their base are 5·5 millim. broad, including the fins, without the fins scarcely 1·5 millim. The dorsal and ventral scutes have the same breadth of 0·75 millim. The ventral scutes in the region of the disk are somewhat broader than long and scarcely narrower at their proximal than at their distal margin; the latter is slightly emarginate, while the lateral margins show a deeper emargination; orally from the lateral emargination a short oblique line indicates the point of junction of the ventral scute with the lateral scute; the angles which unite the lateral with the distal margin are rounded off. In the middle of the length of the arm the ventral scutes are considerably narrower at their proximal than at their distal margin, the lateral emarginations are no longer distinct, but, on the other hand, the oblique lines of junction of the ventral scutes with the lateral scutes have become comparatively longer. The dorsal scutes in the middle division of the arm have on the whole a rounded rhombic form; their greatest breadth is nearer to their distal than to their proximal end; the two distal sides of the rhombic form pass into each other in a more broadly rounded fashion, the two lateral angles are also rounded off, while the proximal angle is transversely truncated; the median portion of the dorsal scute is somewhat more convex than the lateral parts, so that a broad but rather low longitudinal keel is produced upon the middle of the back of the arm. The lateral scutes form upon each side of the arm a high band or plate, which commences on the ventral surface of the arm at the insertion of the tentacular scale hereafter to be mentioned, and, ascending to the dorsal surface in a curved line, extends to the proximal part of the lateral margin of the dorsal scutes; this band serves for the insertion of the brachial spines.

The hyaline brachial spines occur in three different forms:—1, as hooks; 2, as spinulose spines; 3, as the supporting rods of the fins. Starting from the dorsal surface of the arm each

lateral scute bears in the first place near the tentacular scale a hook; then follows a spinulose spine, and beyond this begins the fin, into the composition of which (in the lower and middle parts of the arm) there enter ten bacilliform spines. The hooks possess four buccally directed, curved points, which stand in a row one below the other; towards the apex of the arm the number of points diminishes to three and finally to two. The spinulose spines are about half as long again as the hooks, but, like these, stand off obliquely from the arm and have the form of a club beset with spines in its outer half; the basal portion of the club shows an enlargement for articulation upon the band of the lateral scute. The supporting rods of the fin are also attached by an enlarged base; but above this they rather quickly diminish into a thin rod, which gradually becomes thinner and traverses the fin to its free lateral margin, following a slightly curved course. The supporting rods usually do not terminate in a simple point, but fork a little before their termination, so that the two branches of the fork lie close together. The reticulate structure of the calcareous bodies of the Echinodermata is well developed in the thickened base of the supporting rods, but is deficient in their middle part, although it is indicated in the terminal section by fine, oblique, transverse canals. If we distinguish the supporting rods by consecutive numbers, starting from the ventral surface of the arm, there is a slight increase of length from 1 to 3 and a diminution from 4 to 10; 5 is of about the same length as 1, while 10 is only half as long.

The fin is formed by a thin transparent membrane, in which we can distinguish an inner margin attached to the band of the lateral scute, a free anterior margin directed towards the tip of the arm, a free outer margin, and a free posterior margin turned towards the base of the arm. The course of the line of insertion of the fin upon the lateral scute causes the anterior margin to originate on the ventral surface and the posterior margin on the dorsal surface of the arm. As the whole fin from the anterior to the posterior margin has a greater extent than the length of an arm-joint, the consecutive fins lie over one another like tiles, so that in looking at the arm from the back the aboral portion of each fin is overlain by the adoral part of the next one. The anterior and posterior margins of the fin are not formed by the first and last supporting rods, but by a narrow border of the fin-membrane, which runs along the rods in question. At the free outer margin the fin-membrane passes in curves from the tip of one supporting rod to that of the next.

In the basal part of the arm the fins show some variations. In the first place, on the first three free arm-joints (*i. e.* those not entering into the disk) the two fins which belong to each arm-joint are not separated from each other, but are united into one on the dorsal surface by fusion of their hinder margins. In the second place, on the (four) arm-joints situated within the disk the fins behave otherwise than on the free arm. The first of these joints, that lying nearest to the mouth, bears on each side only two small spinules, which in their position correspond with the hooks and spinulose spines; the first arm-joint also is destitute of the tentacular scale. From the second arm-joint onwards the tentacular scale is present; the second joint further possesses on each side a distinct hook, a spinulose spine, and, instead of the fin, a smooth spine. On the third arm-joint there is on each side the hook, the spinulose spine, and two or three smooth spines united by swimming-membranes. On the fourth joint the fin-structure is already complete.

The feet, as in many other Ophiurans, are beset with small warts on their surface; the buccal feet also show the same character.

No less worthy of notice than the fins of the arms are the peculiar structures into which the dorsal spines of the disk have been developed. If the disk be examined from above under a low power, it is seen to be covered with a delicate, close, satiny down, which, on closer examination, proves to consist of a number of fine, generally hexagonal, funnels. Each funnel consists of a short thick spine, which at its outer end is continued into six comparatively long fine spines of unequal length, so united to each other by a thin membrane that a funnel is produced, the delicate membranous wall of which is supported by the six fine spines. Sometimes, however, only five such supporting spines are present. The thick stalk of the funnel is articulated upon a dense but very fine calcareous reticular tissue, lying in the dorsal skin of the disk. The dorsal skin of the disk further contains very thin radial scutes, of which, in the uninjured disk, only the distal points are uncovered by the funnels; so that it is only when the latter are removed that it is seen that the thin radial scutes are of a rounded triangular form and joined together in pairs by their longest sides.

On the thin, soft, translucent skin of the ventral surface of the disk the funnels are wanting, and, indeed, at the periphery of the dorsal skin they separate from each other and become less numerous in the direction of the interradii. In place of them we find in the ventral skin scattered, rather distant,

minute, circular, latticed plates, in the middle of which rises a short spinule, which bears at its free extremity several parallel points but no funnel.

The peristome is 3 millim. in diameter and is constructed in a manner which at once reminds one of the genera *Ophiothrix* and *Ophiogymna*. Buccal papillæ are entirely wanting. The dental papillæ stand externally in three, and further inwards in two rows one over the other; whether these are followed further in by some true teeth (*i. e.* papillæ standing in a row one above the other) I could not ascertain without damaging the specimen too much. The corner-pieces of the mouth leave between them a gap widening aborally in the middle line of each interradius. The lateral buccal scutes are slightly curved, narrow, broader at the adradial than at the abradial end, and do not touch each other. The buccal scutes are broader than long, rhomboidal, with rounded angles and slightly emarginate sides; the aboral angle is much more broadly rounded off than the adoral. The broad buccal fissures are directly contiguous to the outer sides of the buccal scutes, and are separated only by a narrow interspace at the outer angles of the latter*.

Systematic Position.—The above-described fins are perfectly characteristic of the present form, and as we know of no similar arrangement in any other species of Ophiurid, it seems justifiable to establish a new genus under the name of *Ophiopteron*. But if we leave the fins out of consideration, and only look at the other characters, our new form appears to be most nearly related to the genus *Ophiothrix*. In favour of this relationship we have not only the structure of the peristome, but also the rest of the formation of the disk, as well as, in an equal degree, the structure of the arms. The peristome of *Ophiopteron* presents the same characters as in *Ophiothrix*—the absence of buccal papillæ, gaps between the buccal corner-pieces, and transverse buccal scutes not projecting into the interbrachial regions. The radial scutes also agree in form and position with those of *Ophiothrix*. The peculiar funnel-shaped spinosity of the back of the disk, so far as it consists of calcareous tissue, is present in several species of *Ophiothrix*; but the latter do not possess the fine

* After the above description was written I received from Dr. Brock a second, but unfortunately very badly preserved specimen, the arms of which are as much as 36 millim. long, while the disk has the same diameter as in the specimen above described. In this second example the colour of the disk is light greenish and the arms show indications of pale green transverse bands. It is particularly remarkable that the fins are so torn and damaged that at the first glance one can hardly recognize the animal.

membrane which forms the wall of the funnel; in connexion with this the figures which Lyman has given* of the dorsal spines of several species of *Ophiothrix* may be consulted. In the arms the agreement with *Ophiothrix* lies in the form of the ventral and dorsal scutes, the singleness of the tentacular scales, the glassy texture of the divergent spines, of which the single (free) spine, as in *Ophiothrix*, is spinulose on the sides and at the apex, and, lastly, in possession of the hooks, which are also present in *Ophiothrix*.

Finally, attention may be called to the resemblance which the fin-formation in *Ophiopteron* presents to that of the Pterasteridæ. As in those starfishes, it is precisely the lateral scutes which are homologous with the adambulacral plates, the spines of which in the Ophiuran before us become united by a swimming-membrane to form a fin.

VI.—*Descriptions of a new Genus and some new Species of Cicadidæ belonging to the Oriental Region.* By W. L. DISTANT.

THE following descriptions are the result of an examination of the collection of Oriental Cicadidæ in the Leyden Museum, for which I am indebted to the kindness of Dr. Ritsema, of a small but extraordinary novel collection made in Karwar and forwarded to me by E. T. Atkinson, Esq., and of another small collection received from the southern slopes of the Nilgiris and made by my ever helpful friend G. F. Hampson, Esq. All these species will be subsequently figured.

Gæana Atkinsoni, n. sp.

Head and thorax above black; eyes and a transverse fascia between them, posterior margin of pronotum, two linear obconical spots on disk at anterior margin of mesonotum and its lateral margins, and the cruciform elevation ochraceous; abdomen above and below ochraceous. Head beneath, sternum, and legs black; apical half of face, a transverse spot between face and eyes, and disk and margins of sternum

* "Ophiuridæ and Astrophytidæ, new and old," in Bull. Mus. Comp. Zool. Camb., Mass., vol. iii. no. 10 (1874), pl. iii. figs. 19, 21-25, pl. iv. fig. 25.